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Four new *Euthria* (Mollusca, Buccinidae) from the Cape Verde archipelago, with comments on the validity of the genus

Cuatro nuevas *Euthria* (Mollusca, Buccinidae) del archipiélago de Cabo Verde con comentarios sobre la validez del género

Emilio ROLÁN* António MONTEIRO** and Koen FRAUSSEN***

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ABSTRACT

Four species, collected in the Cape Verde Islands, are described as new and assigned to the genus *Euthria* M. E. Gray, 1830. The new species are compared with other taxa from the Mediterranean Sea and the Cape Verde Archipelago. The genera *Euthria*, and *Buccinulum* are compared and the significance of the differences between them is discussed, leading to the conclusion that both genera are valid and should be kept separated.

RESUMEN

Se describen cuatro especies nuevas del género *Euthria* M. E. Gray, 1830 recogidas en aguas circalitorales del archipiélago de Cabo Verde. Las nuevas especies son comparadas con otros taxones congenéricos existentes en el Mediterráneo y en el propio archipiélago. Recientemente, el género *Euthria*, únicamente conocido del Atlántico oriental, ha sido sinonimizado con *Buccinulum*, que posee especies en el Indo-Pacífico, por lo que se comparan ambos géneros y se discute el valor de las diferencias entre ellos, considerando finalmente que ambos son válidos, y deben mantenerse separados.

KEY WORDS: *Euthria*, *Buccinulum*, Cape Verde Archipelago, new taxa.
PALABRAS CLAVE: *Euthria*, *Buccinulum*, Archipiélago de Cabo Verde, nuevos táxones.

INTRODUCTION

During the last few years, the genus *Euthria* Gray, 1850 has frequently been considered as a synonym of *Buccinulum* Deshayes, 1830 (Beets, 1985, Sabelli, Giannuzzi-Savelli and Bedulli, 1990, Poppe and Goto, 1991, Bouchet, Le Renard and Gofas, 2001, Chiarelli, 2002), but regarding the differences between both genera we suggest to keep them separate, as commented upon in "Remarks" of this paper.

The genus *Euthria* is represented in the Mediterranean Sea by a single species, *Euthria cornea* (Linné, 1758), which is rather variable. On the contrary, several species have been described, by Dautzenberg and Fischer (1906), Cosel (1982b), Cosel

* Cánovas del Castillo, 22-5ºF, 36202 Vigo, España, emiliorolan@inicia.es
** Largo da Princesa 24-1ºE, 1400-303 Lisboa, Portugal, a.j.a.monteiro@netcabo.pt
*** Leuvensestraat 25, B-3200 Aarschot, Belgium, koen.fraussen@skynet.be

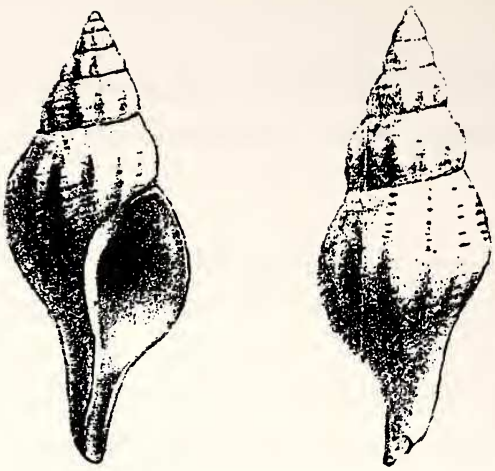


Figure 1. *Euthria saharica*. Original representation of the holotype (from LOCARD, 1897).
Figura 1. Euthria saharica. *Representación original del holotipo (de LOCARD, 1897).*

AND BURNAY (1983) and ROLÁN (1985), for the Cape Verde Archipelago, and a revision of the genus has been published by ROLÁN (1987).

In addition to the species from the Mediterranean and from Cape Verde, LOCARD (1897) has described *Euthria saharica* (Fig. 1), MARCHE-MARCHARD AND BREBION (1977) have described *Euthriostoma gliberti*, both from the western coast of Africa. These species have a more fusiform shell, with an elongated siphonal channel, that it is we consider it doubtful that they belong to the genus *Euthria* at all. BOUCHET AND WARÉN (1986) have placed these species in synonym together with *Metzgeria apodema* Bouchet and Talavera 1981, considering it is not an *Euthria*. GUERREIRO AND REINER (2000) show some shells belonging to this genus that do not match the ones previously known for the archipelago and identify them as *E.* cf. *saharica* and *E. cornea*. ROLÁN (in press), in a review of the Cape Verde gastropod fauna, mentions these references, but states that it is unlikely that the proposed identifications are correct.

The present paper is based on material obtained during the last few years by César Fernandes. This material has been dredged from deep waters in different points of the Archipelago.

Abbreviations:
MNCN Museo Nacional de Ciencias Naturales, Madrid
CCF collection of César Fernandes, Cascais
CER collection of E. Rolán, Vigo

SYSTEMATICS

Genus *Euthria* M. E. Gray, 1850

Type species: *Buccinum corneum* Linné, 1758. Recent, Mediterranean. Original designation: "*Fusus lignarius* Chiaje" (this is *Fusus lignarius* Lamarck, 1816, a junior synonym of *Murex corneus* Linnaeus, 1758).

Description: GRAY (1850): "Teeth, central 1 large, lateral 1-1, versatile. Muzzle rectactile. Operculum annular. Siphon of mantle produced in front" for

the family; "Operculum ovate, acute; nucleus apical. Varices of shell rudimentary or none" for the group to which belong; and, finally "Canal elongate" for the genus. THIELE (1935): "Shell spindle-shaped, with high, ribbed spire; aperture oval; canal in most cases fairly long, somewhat oblique. Operculum with terminal nucleus".

Remarks: All Recent *Euthria* species have a more or less conspicuous subsutural depression or concavity (*E. rolani* von Cosel, 1982, ornamented with a thick and rather bulbous suture, being an exception); they have some axial sculpture on the upper whorls, and lack well developped spiral sculpture but occasionally show some fine cords or striae (the only exception being *E. effendyi* [see FRAUSSEN, 2002] - of which we have no radula available - to ensure the generic placement, an Indonesian species which is closely related to the fossil fauna).

The radula of *Euthria*, consisting of 3 teeth (1 middle, 2 lateral) with each 3 cusps, is typical for Buccinidae. The form of the middle tooth (triangular with the cusps on the broad upper corner) (IREDALE 1917, COOKE 1917, SHUTO 1978, ROLÁN 1987), is shared with *Euthriostoma* Marche-Marchard and Brebion, 1977 (Fraussen, unpublished) and *Afer* Conrad, 1858 (FRAUSSEN and HADORN 1999).

The radula of *Buccinulum* is similar in general aspects but differs by a somewhat broader, lesser triangular central tooth with more rounded margins (COOKE 1917). We can base this comparison on a limited number of species only, as a more thoroughfull study of the radula of all New Zealand species is beyond the limit of the present paper. Further study probably can bring more light on the eventual presence of *Euthria* species among the buccinulums of New Zealand.

The radulae of *Siphonofusus* KURODA AND HABE, 1954 and *Afrocominella* IREDALE, 1918 are similar too, but differ by the quadrangular middle tooth with rather sharp corners (COOKE, 1917, BARNARD, 1959).

The type species of *Buccinulum* (*B. lineum* Martyn, 1784) (Figs. 29-31), and consequently other Pacific species included in the same genus, doubtlessly have a certain morphological resemblance to the Atlantic species of *Euthria*. Conchological differences between *Euthria* and *Buccinulum* are rather slight, but we must recognize the presence of somewhat prominent axial ribs on the upper whorls and a clear subsutural concavity in *Euthria*. The material of which the shell of *Buccinulum* is produced will be an interesting matter for further study, as the surface is not as smooth and brilliant as in *Euthria*, which is rather glossy, especially in the Indo-West Pacific.

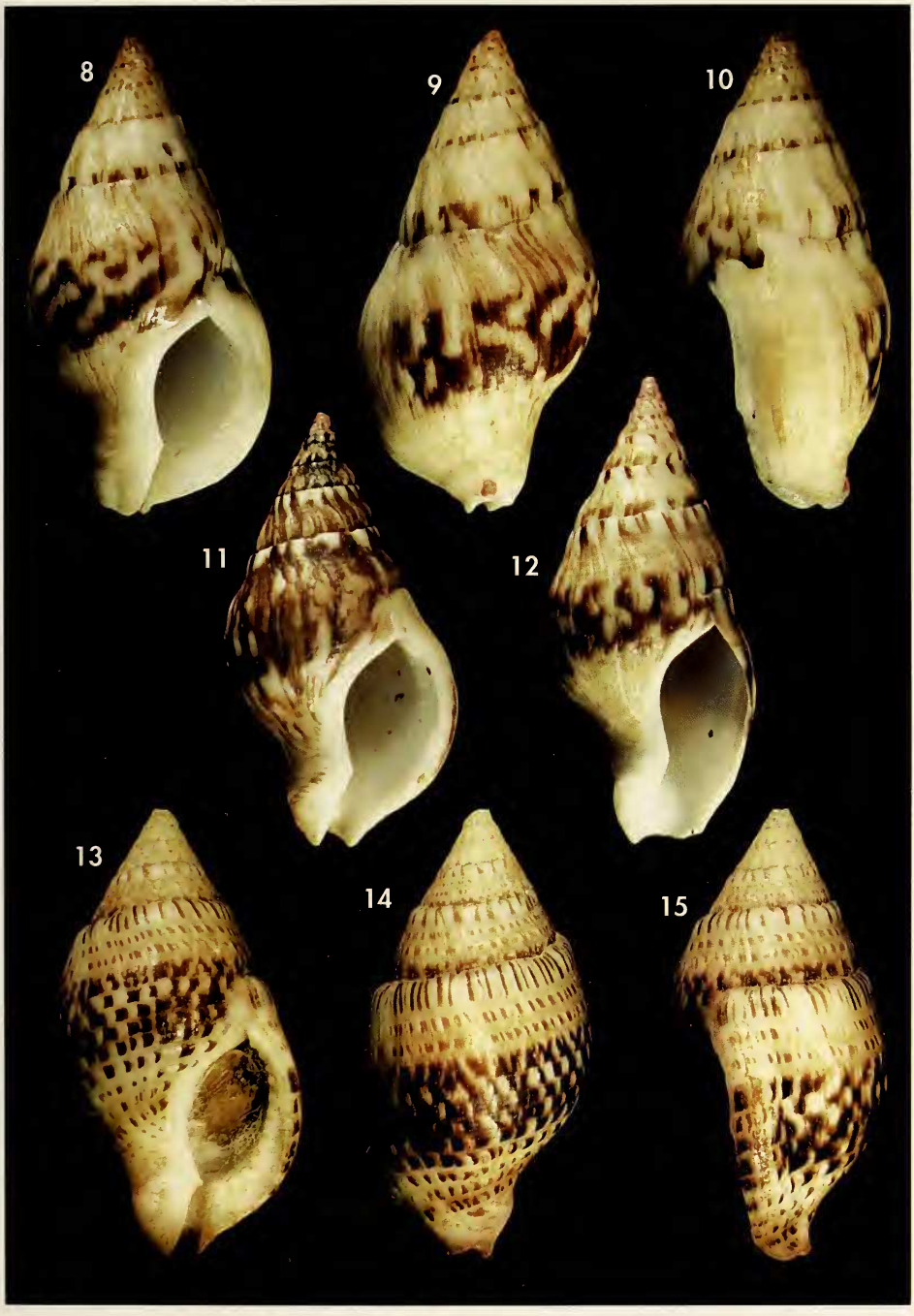
We agree with BEETS (1986) to consider the Indonesian archipelago as the geological center of *Buccinulum* and *Euthria*. In the Recent fauna we can recognize 4 important geographical areas: the important radiation of *Buccinulum* around New Zealand (differentiated from typical *Euthria* already early in history during the Tethys Sea), an *Euthria* radiation along the coasts of the Indian Ocean, another on the lower shelf around New Caledonia and, finally, the East Atlantic *Euthria* - *Euthriostoma* - *Afer* radiation (separated from the main group during the split of the Tethys Sea). The species described as new in the present paper are an addition to this latter group.

Regarding the difference in radula, geographic-geological separation and a number of slight conchological differences cited above, we consider the genera *Euthria* and *Buccinulum* as being different and keep them separate.

Euthria soniae spec. nov. (Figs. 2-7, 23B, 25A, 28E)

Type Material: Holotype (Figs. 2-4) in MNCN (15.05/46582). Paratypes in: CCF (1, Fig. 5), CER (1, Fig. 6), MNHN (1, Fig. 7).

Figures 2-7. *Euthria soniae*. 2-4: Holotype, 53.3 mm, Cape Verde archipelago (MNCN); 5: Paratype, 46.3 mm (CCF). 6: Paratype, 47.2 mm (CER). 7: Paratype, 50.2 mm (MNHN).
Figuras 2-7. Euthria soniae. *2-4: Holotipo, 53,3 mm, archipiélago de Cabo Verde (MNCN); 5: Paratipo, 46,3 mm (CCF). 6: Paratipo, 47,2 mm (CER). 7: Paratipo, 50,2 mm (MNHN).*



Figures 8-12. *Euthria marianae*. 8-10: Holotype, 36.9 mm, between São Vicente and São Nicolau, CV (MNCN). 11: Paratype, 33.4 mm (CCF). 12: Paratype, 35.3 mm (CER). Figures 13-15. *Euthria* cf. *marianae*. Concha, 34.0 mm, between São Vicente and São Nicolau, CV (CCF).
Figuras 8-12. Euthria marianae. *8-10: Holotipo, 36,9 mm, entre São Vicente y São Nicolau, CV (MNCN). 11: Paratipo, 33,4 mm (CCF). 12: Paratipo, 35,3 mm (CER). Figuras 13-15.* Euthria cf. marianae. *Concha, 34.0 mm, entre São Vicente y São Nicolau, CV (CCF).*

Type locality: Cape Verde Archipelago. The type material was donated by Capeverdian fishermen without exact information. It is however likely that it was captured in "barlavento" group of islands.
Derivatio nominis: The new species is named after biologist Sonia Elsy Merino, who has dedicated herself to the study and conservation of the marine fauna, working in Porto Mindelo, São Vicente, Cape Verde Archipelago, and who has cooperated with our research.

Description: Shell (Figs. 2-7) ovoid-fusiform and solid. The protoconch (Fig. 23B, 25A, 28E) is yellowish, with 1 3/4 - 2 spiral whorls and a diameter of about 1.7 mm. Teleoconch with 7 rapidly increasing whorls. The whole spire presents axial ribs, 9 - 10 in number on first whorl, 10-12 on last whorl. Subsutural ramp strongly depressed. Aperture ovoid, white, with 12-13 internal folds visible at the internal part of the peristome; it is continued with a narrow and slightly curved siphonal canal. Yellowish to brown undulated axial flammules, sometimes coalescing, and even forming a reticulated pattern, appear on a white background.

Holotype 53.3 mm x 21.1 mm. The paratypes are slightly smaller, the smallest one being 46.3 mm long.

Soft parts unknown.

Distribution area: The species is known only from the Cape Verde Archipelago. The short protoconch suggests an insular endemism.

Comparison: The present species must be compared with *E. cornea*, which has a similar profile, but is sometimes larger, [easily up to 65 mm, but also larger: 84,7 mm in F. Pusateri collection, Palermo, and SETTEPASSI (1971) records the maximum size known at 88 mm]. *E. cornea* has axial nodules on the first 4-5 spiral whorls, rarely on the last one. The main difference is the protoconch, which in *E. cornea* (Figs. 23A, 28A) has a little more than 1 whorl, with about 0.8 mm, and in *E. soniae* (Fig. 23B, 28E) has between 1 3/4 and 2 whorls, with about 1.7 mm of diameter.

Euthria marianae spec. nov. (Figs. 8-12, 24B, 28C)

Type material: Holotype (Figs. 8-10) in MNCN (15.05/46583). Paratypes in: CCF (1, Fig. 11), CER (1, Fig. 12).
Type locality: Between São Nicolau and São Vicente, at a depth of 75 - 150 m, in the Cape Verde Archipelago.
Derivatio nominis: The new species is named after Mariana, the grand daughter of César Fernandes - a well-known Portuguese collector who has greatly contributed to the knowledge of the malacological faunas of the Cape Verde Islands and of Mozambique - and the daughter of César Fernandes Jr., a keen diver and shell hunter.

Description: Shell (Figs. 8-12) ovoid-fusiform and solid. The protoconch (Figs. 24B, 28C) is pink, with between 1 3/4 and 2 spiral whorls and a diameter of about 1.5 mm. Teleoconch with about 6 rapidly increasing spiral whorls, with weak undulating axial ribs, present on the whole shell, 11 on the first whorl, 16 on the last whorl. Subsutural ramp slightly depressed, suture nodulous. Aperture ovoid, white, with about 11 teeth in inner part, continued with internal folds; the aperture extends into a narrow, elongated and curved siphonal canal. Background colour white, with a brown band with white blotches on the last whorl; this band is visible on previous whorls on a short part on the suprasutural area.

The holotype mesures 36.9 x 19.1 mm. The paratypes are of similar size.

Soft parts unknown.

Distribution area: The species is known only from locations between S. Nicolau e S. Vicente, at 75 - 150 m of water, taken from traps.

The short protoconch suggests an insular endemism.

Comparison: The present species must be compared with *E. rolani* Cosel, 1982

and *E. boavistensis* Cosel, 1982, which have similar aspects. *E. rolani* was collected near Santa Luzia in shallow water, and the shell is more globose and solid, the aperture is pink-violet instead of white, the subsutural area is not depressed, the colour pattern is different, with wide blotches, and the protoconch is wider and dark brown (Figs. 24A, 27, 28B), about 2.1 mm in diameter. *E. boavistensis* has a smaller shell, with a different, more irregular, colour pattern, the aperture constantly pink and the protoconch a little smaller (about 1.2 mm diameter).

Euthria fernandesi spec. nov. (Figs. 16-18, 28B, 28D)

Type material: Holotype (Figs. 16-18) deposited in MNCN (15.05/46584).
Type locality: Dredged between the islands of Maio and Boavista, at 75 - 125 m, Cape Verde Archipelago.
Derivatio nominis: The new species is named after the well-known Portuguese shell collector César Fernandes.

Description: Shell (Figs. 16-18) ovoid-fusiform and solid. The protoconch (Figs. 25B, 28D) is white, with a little more than 2 spiral whorls and a diameter of 2.2 mm. Teleoconch with 6 rapidly increasing spiral whorls, with axial ribs on the whole shell, 10 on the first whorl, 16 on the last whorl; these ribs are present at the suture, giving it a nodulous aspect. Subsutural ramp strongly depressed. Aperture ovoid, white, with 13 folds on its outer lip; the aperture extends into a narrow, slightly elongated and dorsally curved siphonal canal. The background colour is irregular light brown, with numerous small axial white lines; there is a suprasutural broad dark brown spiral band, interrupted by white blotches, and other similar but less conspicuous bands towards the anterior end of the shell.

The holotype is 51.3 mm x 22.6 mm.

Soft parts unknown.

Distribution area: The species is only known from the type locality

The short protoconch suggests an insular endemism.

Comparison: Only the holotype is available, but we decide to describe this species, because of important differences with other congeneric species.

E. fernandesi spec. nov. must be compared with *E. cornea*, and it may be separated because the latter species does not have the conspicuous coloured bands, and the last whorls usually lack axial and spiral sculpture. Furthermore, the protoconch has only one whorl, it is cream or light brown, and its diameter is smaller (only 0.8 mm in diameter, versus 2.1 mm in the new species).

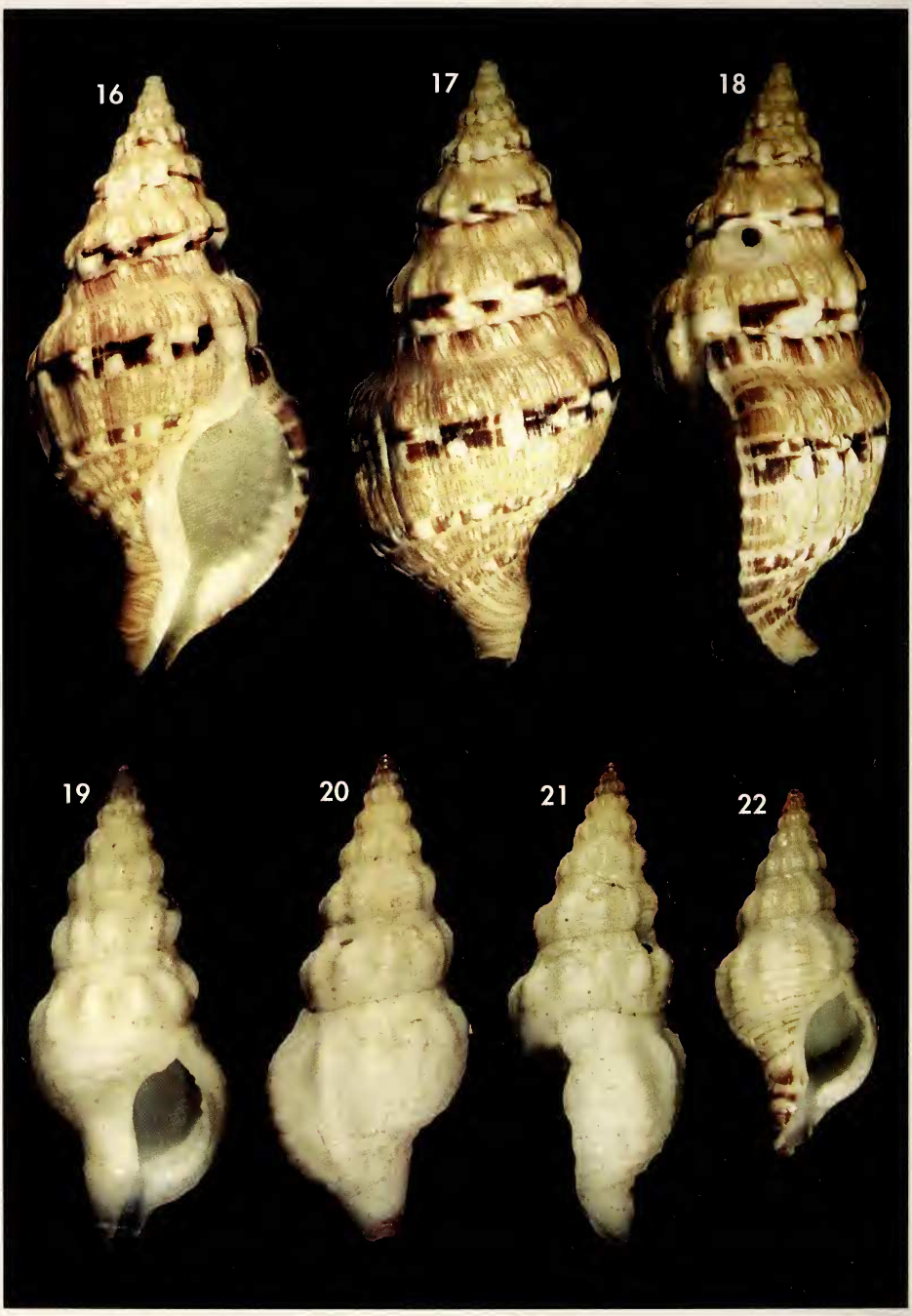
E. calypso Cosel and Burnay, 1983 has a similar size, but the shell pattern is different, with spiral blotches only, more evident on the suture, and lacking axial sculpture, except in the first whorls of the teleoconch. Its spiral sculpture is formed by spiral threads, which are evident on the first whorls only, and the subsutural depression is less evident. The whorls are less convex.

E. pulicaria Dautzenberg and Fischer, 1906 has a smaller, less elongated shell, with a small subsutural depression but prominent suture, a different colour pattern and a smaller siphonal canal.

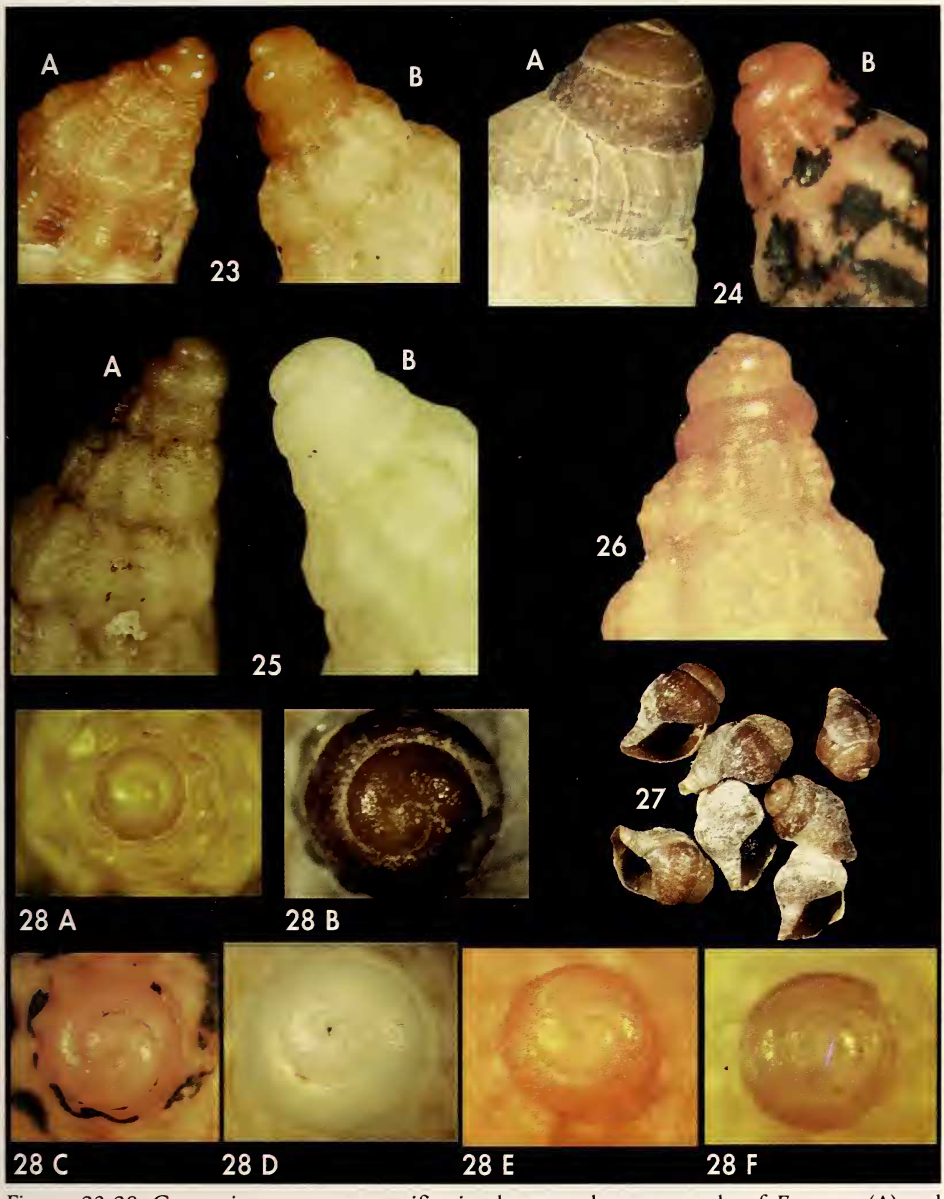
E. soniae spec. nov. lacks spiral sculpture, has a more elongated spire, the colour pattern is formed by axial flammules without any spiral banding, and the protoconch is smaller and yellowish (instead of white).

Euthria helenae spec. nov. (Figs. 19-22, 26, 28F)

Type material: Holotype (Figs. 19-21) in MNCN (15.05/46585). Paratypes in: CCF (1, Fig. 22), CER (1).
Type locality: Between São Nicolau and São Vicente, at 75 - 125 m depth, Cape Verde Archipelago.

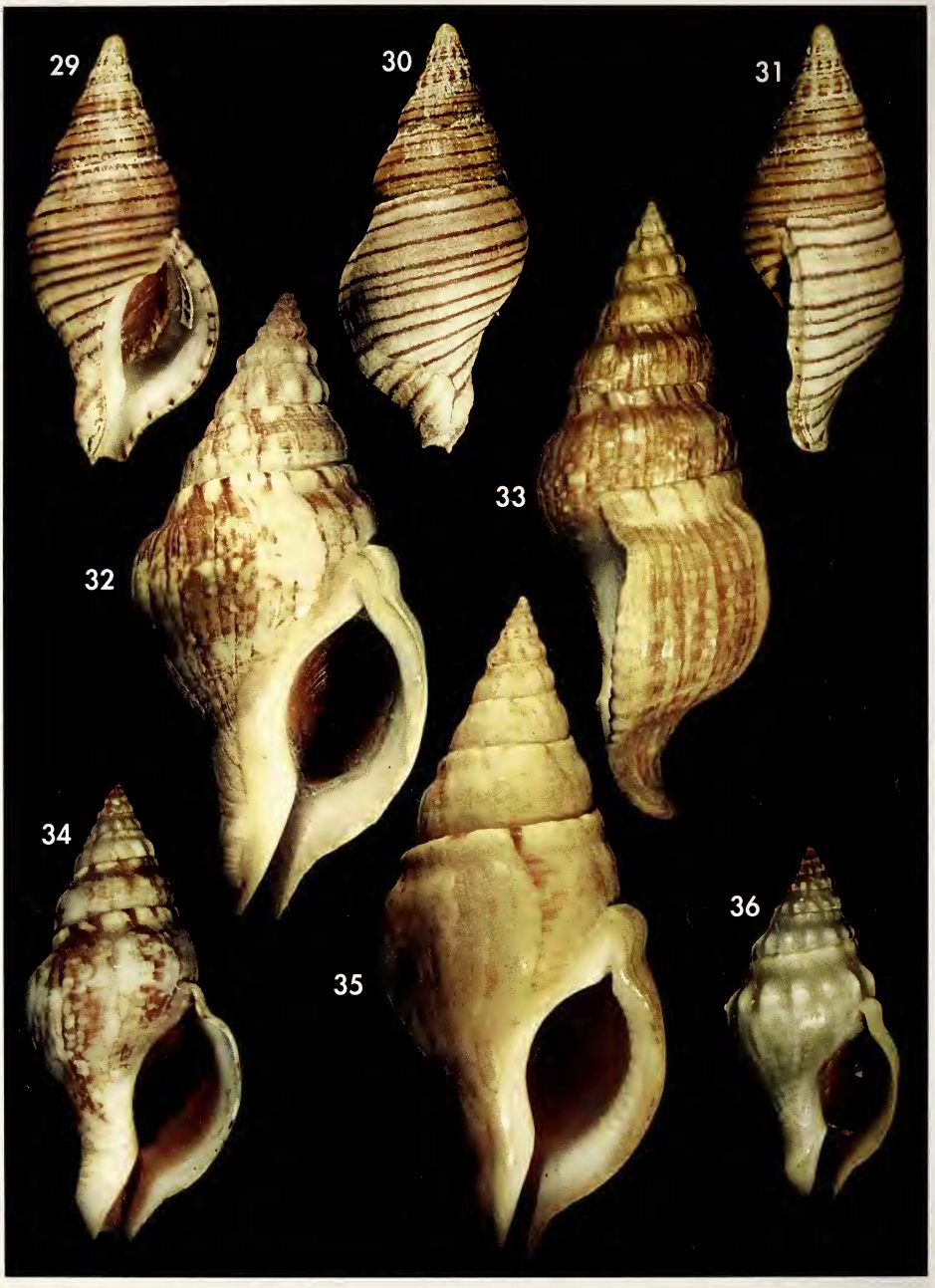


Figures 16-18. *Euthria fernandesi*. Holotype, 51.3 mm, between São Nicolau and São Vicente, CV (MNCN). Figures 19-22. *Euthria helenae*. 19-21: Holotype, 40.2 mm, between São Nicolau and São Vicente, CV (MNCN); 22: Paratype, 25.4 mm, (CCF).
Figuras 16-18. Euthria fernandesi. *Holotipo, 51,3 mm, entre São Nicolau y São Vicente, CV (MNCN). Figuras 19-22.* Euthria helenae. *19-21: Holotipo, 40,2 mm, entre São Nicolau y São Vicente, CV (MNCN); 22: Paratipo, 25,4 mm, (CCF).*



Figures 23-28. Comparison at same magnification between the protoconchs of *E. cornea* (A) and *E. soniae* (B); 24: Comparison at same magnification between the protoconchs of *E. rolani* (A) and *E. marianae* (B); 25: Comparison at same magnification between the protoconchs of *E. soniae* (A) and *E. fernandesi* (B); 26: Protoconch of *E. helenae;* 27: Larval shells of *E. rolani* before hatching; 28: Comparison at same magnification between the protoconchs of *E. cornea* (A), *E. rolani* (B), *E. marianae* (C), *E. fernandesi* (D), *E. soniae* (E) and *E. helenae* (F).

Figuras 23-28. Comparación al mismo aumento entre las protoconchas de E. cornea *(A) y* E. soniae *(B); 24: Comparación al mismo aumento entre las protoconchas de* E. rolani *(A) y* E. marianae *(B); 25: Comparación al mismo aumento entre las protoconchas de* E. soniae *(A) y* E. fernandesi *(B); 26: Protoconcha de* E. helenae*; 27: Conchas larvarias de* E. rolani *antes de la eclosión; 28: Comparación al mismo aumento entre las protoconchas de* E. cornea *(A),* E. rolani *(B),* E. marianae *(C),* E. fernandesi *(D),* E. soniae *(E) y* E. helenae *(F).*



Figures 29-31. *Buccinulum lineum*, 35.5 mm, New Zealand (CER). Figures 32-36. *Euthria cornea*. 32: Shell, 51.2 mm, Faro, Algarve, Portugal (CER); 33: Shell, 50.6 mm, Cabo de Palos, Murcia, Spain (CER); 34: Shell, 37.9 mm, Malta (CER); 35; Shell, 54.7 mm, Sokakagzi, Turkey, 125 m (CER); 36: Shell, 29.2 mm, Karaade Island, South of Bofrum, Turkey (CER).

Figuras 29-31. Buccinulum lineum*, 35,5 mm, Nueva Zelanda (CER). Figuras 32-36.* Euthria cornea. *32: Concha, 51,2 mm, Faro, Algarve, Portugal (CER); 33: Concha, 50,6 mm, Cabo de Palos, Murcia, Spain (CER); 34: Concha, 37,9 mm, Malta (CER); 35: Concha, 54,7 mm, Sokakagzi, Turquia, 125 m (CER); 36: Concha, 29,2 mm, isla Karaade, sur de Bofrum, Turquia (CER).*

Derivatio nominis: The new species is named after Helena Monteiro, the wife of the second author, who for many years has endured long hours of malacological discussion at home, long sessions of shell collecting and bad smelling jars about the house. All shell collectors' wives deserve great tribute.

Description: Shell (Figs. 19-22) ovoid-fusiform and solid. The protoconch (Figs. 26, 28F) is light brown, with 2 1/4 spiral whorls and a diameter of about 1.6 mm. Teleoconch with 7 rapidly increasing spiral whorls, with axial ribs on the whole shell, 9-10 on the first whorl, 12 on the last one; these ribs do not reach the lower suture and disappear towards the base. The subsutural ramp is strongly depressed. 4-5 main spiral threads on the first whorls, 18 on the last one; between them there are other smaller threads, only visible under magnification. Aperture ovoid, white, with 11 internal folds at the external part; the aperture extends into a narrow slightly elongated and curved siphonal canal. Colour whitish cream, except for the protoconch and the first two whorls of the teleoconch, which are brown. The tip of the siphonal canal is also dark in the holotype. The two paratypes are ornamented with dark blotches at the base and brown colour in the spaces between the lower spiral cords.

Dimensions: Holotype is 40.2 x 17.3 mm.

Soft parts unknown.

Distribution area: The species is known only from the type locality, collected in traps.The short protoconch suggests an insular endemism.

Comparison: The present species has spiral threads and a deep suture as its main characteristic, and so we will compare it with other species with a similar sculpture.

E. pulicaria has a smaller, more globose and shorter shell; the suture is prominent instead of deep, the subsutural depression is scarcely noticeable and it is ornamented with a brownish banded pattern.

E. adeles Dautzenberg and Fischer, 1906 has a smaller shell, with a shallower suture, the profile of the last whorl lesser convex, and a shorter siphonal canal.

E. calderoni has a smaller, narrower, more elongate shell, with variable colour, smaller protoconch and variable apertural colour.

REMARKS

As far as the specific separation is concerned, we have had the possibility of examining large samples of the type species, *E. cornea*. This species seems to be present only in the Mediterranean Sea - Tanger being the most western location mentioned by PASTEUR-HUMBERT (1962) in his study of the fauna from Morocco - and, to the North, it reaches the Atlantic, being present at Algarve, on South Portugal (pers. inf.). It is usually found in shallow waters, but has also been taken from depths of over 100 m. Within its geographical range, the species presents a wide morphological variability (Figs. 32-36), which even made ROLÁN (1987) consider the possibility that more than one species could be under hand. However, and despite the mentioned variability, all specimens show a short protoconch (Figs. 23A, 28A), with a single spire whorl, of a cream colour and a diameter of about 0.8 mm.

Among the species known from Cape Verde, the great morphological variability in the shells of *E. calderoni* has already been stressed (see ROLÁN, 1987), and it will be documented in further studies (ROLÁN, in press). But the examination of the protoconch and of juveniles - in ages close to hatching - has shown that a great intraspecific similitude in the larval shells exists, as well as a great interspecific separation, which made comparison with the newly found species, all of them easy to distinguish from *E. cornea*.

So, it is obvious that our knowledge about this genus in the Cape Verde Islands has grown a lot in the last few years, from the three species mentioned by VON COSEL (1982a) to the ten presently known species. But some material waiting further study

Table I. Morphological characteristics of *Euthria* species. 1: maximum length for the species, in mm; 2: axial sculpture on the last whorls, from – to ++; 3: spiral sculpture on the last whorls, from – to ++; 4: colour of inner aperture; 5: colour of protoconch; 6: diameter of protoconch, in mm; 7: number of whorls in the protoconch.
Tabla I: Características morfológicas de las especies de Euthria. *1: máxima longitud de la especie, en mm; 2: escultura axial de las últimas vueltas, de - a ++; 3: escultura espiral de las últimas vueltas, de - a ++; 4: color de la apertura interna; 5: color de la protoconcha; 6: diámetro de la protoconcha, en mm; 7: número de vueltas de la protoconcha.*

	1	2	3	4	5	6	7
E.cornea	88	+-	-	from white to dark brown	light brown	0.8	1 1/8
E. adeles	30	++	+	whitish	brown	?	1?
E. pulicaria	36	++	+	white	pink	?	1?
E. rolani	41	-	-	pink to purple	brown	2.1	2-2 1/4
E. boavistensis	31	-	-	pink to purple	pink	1.2	2
E. calypso	44	-	+-	white	?	?	2
E. calderoni	18	+	+	colour of shell	colour of shell	1.3	2
E. soniae	53	+	-	white	yellowish	1.7	1 3/4-2
E. marianae	37	+	-	white	pink	1.5	1 3/4-2
E. fernandesi	51	++	++	white	white	2.2	2
E. helenae	40	++	+	white	brown	1.6	2 1/4

can involve the discovery of even more undescribed species.

For an easier grasp of the *Euthria* species, we schematically present a few morphological characteristics, in Table I.

Although all the species were collected in the Cape Verde Islands, it is probable that their distribution range does not include the whole archipelago, and also that they have different habitats and depth ranges. Table II shows a summary of this information.

ACKNOWLEDGEMENTS

The authors thank Jesús S. Troncoso, from the Universidad de Vigo, in whose Departamento de Ecología the photos of the present work were made.

Table II. Known distribution area and depth range of the studied species of the genus *Euthria*.
Tabla II. Área de distribución conocida y rango de profundidad de las especies de Euthria *estudiadas.*

	Known distribution area	Depth range
E. .cornea	Mediterranean and South Portugal	shallow water
E. adeles	CV, Santa Luzia	– 52 m
E. pulicaria	CV, Boavista	– 91 m
E. rolani	CV, Santa Luzia	shallow water
E. boavistensis	CV, Boavista	shallow water
E. calypso	CV, between Boavista & Maio	–100 to – 200 m
E. calderoni	CV, all of the Archipelago	shallow water to – 30 m
E. soniae	CV, Barlovento group	– 100 m?
E. marianae	CV, between São Nicolau & São Vicente	– 75 to – 150 m
E. fernandesi	CV, between Maio & Boavista	– 75 to – 125 m
E. helenae	CV, between São Nicolau & São Vicente	– 75 to – 150 m

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